

**ENVIRONMENTAL ASSESSMENT**

**FOR**

**SOUTH HOLLY ROAD ATLANTIC WHITE CEDAR RESTORATION**

**DARE COUNTY BOMBING RANGE**



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# ENVIRONMENTAL ASSESSMENT ATLANTIC WHITE CEDAR RESTORATION

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## **CHAPTER ONE PURPOSE AND NEED FOR PROPOSED ACTION**

### **1.1 Introduction**

#### **1.1.1 Action Proponent**

The primary action proponent for this project is the 4<sup>th</sup> Civil Engineering Squadron (4 CES) of the 4th Fighter Wing (4 FW) at Seymour Johnson Air Force Base (SJAFB), North Carolina. The Dare County Bombing Range is owned and administered by SJAFB. The Air Force maintains a target and impact area in the southern portion of the Range and the Navy leases a target and impact area in the northern portion of the Range.

#### **1.1.2 Proposed Action**

The proposed action is to restore Atlantic white cedar (AWC) in areas where it was historically located at Dare County Bombing Range (DCBR, Range), and specifically, near the southern end of Holly Road. DCBR is 46,621 acres. The Range supports two separate weapon impact areas which occupy approximately 5,000 acres of cleared and maintained land, including administrative areas. Over 32,000 acres remain forested, of which 16,628 acres is classified as commercial timber, as defined by US Forest Service. Approximately 3,362 acres serve as either a buffer around military impact areas or endangered species habitat. The USAF has 18,674 acres currently registered in the North Carolina Natural Heritage Program (NCNHP).

The entire range is not suitable habitat for AWC and CES does not propose to undertake restoration in areas where AWC was not historically found or in areas that do not have the proper conditions to support AWC. Currently, there are approximately 6,502 acres of AWC present on DCBR. A 630 acre contiguous tract of mature AWC is one of the largest tracts found in North Carolina.

The USAF will undertake restoration by first removing stands of hardwoods and loblolly pines. The cleared areas will be treated with an aquatic approved herbicide, to remove competition, and then replanted with AWC seedlings. The removal and replanting of AWC is proposed for approximately 62 acres.

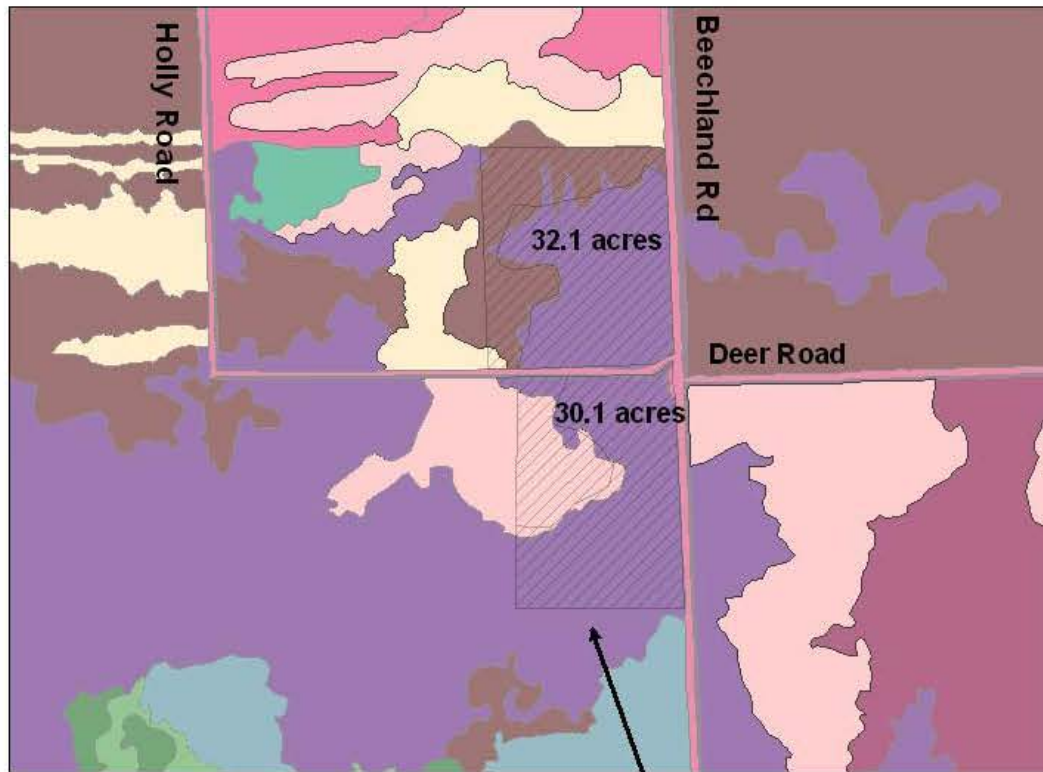
#### **1.1.3 Location of Proposed Action**

Dare County Bombing Range is located on the Dare County peninsula and is surrounded by the Alligator River National Wildlife Refuge (Figure 1). The proposed action will occur north and south of Holly Road near the intersections with Beechland Road and Deer Road (Figure 2).



Figure 1. Location of Dare County Bombing Range and Alligator River National Wildlife Refuge

## Atlantic White Cedar Restoration Site



Project Location

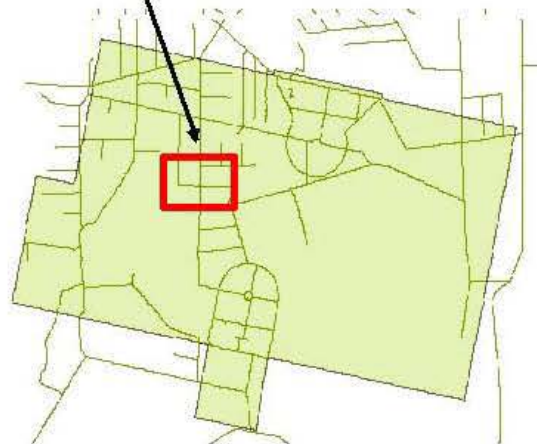


Figure 2. Location of Atlantic White Cedar Restoration Site



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## **1.2 Need for the Proposed Action**

This action is an important part of DCBR's natural resource management program and is consistent with goals outlined in the Integrated Natural Resources Management Plan (2002). The proposed action will remove mature timber, promote new growth, and provide economic benefit. Proceeds from forestry management are used to fund habitat improvement projects that benefit fish and wildlife species. The forest management program, including the proposed harvest, follows U.S. Air Force policy of sustained yield and multiple-use for military owned lands.

## **1.3 Project Objectives**

The objectives of this proposed action are to restore natural communities to the Dare County Bombing Range. Atlantic white cedar is a component of the ecosystem and is rapidly disappearing. Based on historical maps, AWC was a patch component for the southern part of the area. Secondary to AWC restoration, project objectives include multiple use principles, promotion of overall forest health, and the sale of timber products to cover costs associated with removal of hardwoods and replanting with AWC.

## **1.4 Laws and Regulations**

Laws and regulations influencing the scope of this environmental assessment are the National Environmental Policy Act, the Air Force Instruction 32-7064, Integrated Natural Resources Management, and Coastal Area Management Act.

## **1.5 Decisions To Be Made**

The 4th Fighter Wing Environmental, Safety, and Occupational Health Committee Chairman will:

- 1) Select an alternative;
- 2) Determine if the selected alternative would have significant impacts to the human environment (and whether to prepare an environmental impact statement) or issue a Finding of No Significant Impact (FONSI); and
- 3) Determine whether the selected alternative is consistent with the Integrated Natural Resources Management Plan.

The alternatives to be selected from include harvest mixed hardwood and loblolly pine forest stands and replant with AWC at a 62 acre site; remove mixed hardwoods and replant with AWC on less acreage; or do not remove any timber and do not replace with AWC at this time (No Action). Alternatives are detailed in Chapter 2.

## **1.6 Scope of the Environmental Analysis**

### **1.6.1 Agency Involvement**

A Biological Assessment (BA) has been prepared and submitted to US Fish and Wildlife Service to satisfy consultation requirements of Section 7 of the Endangered Species Act.

### **1.6.2 Public Involvement**

The EA will be made available for public review and comment for a 30-day period.

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### **1.6.3 Issues Eliminated from Detailed Study**

#### **1.6.3.1 Air Installation Compatible Use Zone/Land (AICUZ) Use**

The proposed action is within AICUZ principles.

#### **1.6.3.2 Air Quality**

The proposed action would have no effect on air quality.

#### **1.6.3.3 Coastal Zones**

The proposed action is located in the North Carolina Coastal Zone. Timber harvesting and site preparation activities associated with this proposed action will be accomplished in accordance with the guidelines described in the “North Carolina Forestry Best Management Practices Manual to Protect Water Quality” amended September 2006.

#### **1.6.3.4 Cultural Resources**

A cultural resources survey conducted in 1996 by Pan American Consultants, Inc determined that cultural resources are not present in the proposed project area.

#### **1.6.3.5 Hazardous Materials/Waste**

The harvesting of timber will not generate hazardous material or waste.

#### **1.6.3.6 Ground- and Surface-Water Resources**

DCBR utilizes roadside canals to allow for open water to flow as natural as possible. The proposed action would require the contractor to keep the ditches and surface water areas free of any debris. This would ensure no adverse impacts to surface and ground water quality.

#### **1.6.3.7 Wetlands**

The proposed action would occur in jurisdictional wetlands. However, normal silvicultural activities are exempt from permitting requirements of Section 404 of the Clean Water Act.

### **1.6.4 Issues Studied in Detail**

#### **1.6.4.1 Threatened and Endangered Species**

The red cockaded woodpecker (*Picoides borealis*), red wolf (*Canus rufus*), American Bald Eagle (*Haliaeetus leucocephalus*), and American alligator (*Alligator mississippiensis*) will be studied in further detail in Chapter 3.

### **1.7 Consultation Requirements**

The proposed action would require a special-use permit to haul logs through the Alligator River National Wildlife Refuge.

## **CHAPTER TWO PROPOSED ACTION AND ALTERNATIVES**

### **2.1 Introduction**

This chapter describes the proposed action and action alternatives, to include no action. The environmental consequences of those actions are summarized and measured in terms of impacts and achievement of the objective.

### **2.2 Action Alternatives**

#### **2.2.1 Alternative A: No Action**

Alternative A is the no action alternative and under it, AWC would not be replanted on 62 acres at this time. Progress in the restoration of the historic AWC ecosystem would stop and further losses to this declining ecotype would occur. Additionally, existing timber would continue to age, reach maturity, and die. This scenario would also contribute to increased fire risks.

#### **2.2.2 Alternative B: Restore AWC**

Under Alternative B, a logging contractor would clear a 62 acre stand of mixed hardwoods and loblolly pine using logging equipment conventional for the local area. Low-ground-pressure harvesters and skidders are designed to operate in soil conditions typical to DCBR. The cleared area would then be site-prepared and replanted with AWC seedlings.

An Atlantic White Cedar study with North Carolina State University would be located on approximately 45 acres of the 62 acre site (Appendix A). The purpose of the study is to determine optimal planting density, effectiveness of fertilizer and herbicides, and functional forms for growth and yield equations of Atlantic white cedar on the Dare County peninsula. The study would have three replications with three variables: distance between planting beds (10 ft and 20 ft), linear distance between seedlings planted (5 ft, 10 ft, and 15 ft), and fertilizer treatment (fertilized and not fertilized). Planting beds would be approximately 1 foot high by 5 foot wide in all replications.

The study area would be site prepared with the application of an aquatic approved herbicide prior to planting to remove competition. Herbicide control would also be applied in the second growing season (planting beds only). Fertilizer treated plots would receive a triple phosphate fertilizer at a rate of 250 lb/ac every 2 years.

#### **2.2.3 Alternative C: Restore AWC on Less Acreage**

Under Alternative C, AWC replanting would occur on less acreage than the 62 acres of Alternative B. If AWC is replanted on less acreage, the cost per acre for restoration would increase, reducing the available funds for AWC restoration, as well as curtailing the restoration of AWC on DCBR.

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### 2.3 Comparison of Predicted Effects

The following comparison matrix (Table 1) summarizes the predicted effects of the alternatives on the relevant environmental resources and project objectives.

Chapter 4 describes these predictions in detail.

Table 1. Comparison of Alternatives

	<b>Alternative A: No Action</b>	<b>Alternative B: Restore AWC</b>	<b>Alternative C: Restore AWC on Less Acreage</b>
<b><u>Project Objectives</u></b>			
<b>Prepare 62 acres</b>	No	Yes	No
<b>Multiple use of area</b>	No	Yes	Yes
<b>Promote Forest Health</b>	No	Yes	Yes
<b>Cover costs</b>	No	Yes	Yes, but less cost recovery than Alt. B
<b><u>Issues Studied in Detail</u></b>			
<b>RCW</b>	No Effect	No Significant Impact	No Significant Impact
<b>Red Wolf</b>	No Effect	No Significant Impact	No Significant Impact
<b>Bald Eagle</b>	No Effect	No Significant Impact	No Significant Impact

### 2.4 Preferred Alternative

Alternative B is the Air Force's preferred alternative.

## CHAPTER THREE AFFECTED ENVIRONMENT

### 3.1 Introduction

This chapter describes the existing environmental conditions of the area where the proposed action would occur. This section, in conjunction with the description of the no-action alternative, describes the baseline conditions against which the decision-maker and the public can compare the effects of all the alternatives.

NEPA and CEQ regulations specify that an EA should focus only on those resource areas potentially subject to impacts. In addition, the level of analysis applied to any given resource area should be commensurate with the level of impact anticipated for that resource. Applying these guidelines to this EA, descriptions of the affected environment are provided for biological resources and water resources. The following additional resource areas have not been analyzed in this EA, as the potential for impacts was considered to be negligible or nonexistent:

- **Geological Resources.** Implementation of the proposed action would have minimal adverse effect on geological resources. No unique geologic features or hazards are known to be present in the area.
- **Land Use.** The proposed action would be in accordance with Integrated Natural Resources Management Plan, and no changes to existing land use would occur.
- **Socioeconomics and Environmental Justice.** Implementation of the proposed action would not affect socioeconomic resources and would comply with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low Income Populations and EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. The proposed action would occur within the boundaries of DCBR; no impacts to schools, children, or minority populations would occur. The amount of income generated could have an impact on the economy of the surrounding communities. A portion of timber receipts in excess of program operation costs are returned to the county (Dare County) in which they were generated to be used for roads, schools, and other projects.

### 3.2 Threatened and Endangered Species

DCBR is home to three resident species listed on the Endangered Species Act: the red-cockaded woodpecker, red wolf and bald eagle. The American alligator (*Alligator mississippiensis*) is listed due to its similarity in appearance to the American crocodile (*Crocodylus acutus*). Restoration of AWC and associated hardwood clearing activities will not impact the alligator and therefore the species was not studied in further detail.

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### **3.2.1 Red Cockaded Woodpecker**

The RCW is an endangered species found in Southeastern U.S. old-growth pine forests. The USAF is actively managing its RCW population and has prepared a Biological Assessment for the proposed action. According to U.S. Fish and Wildlife Service (USFWS) guidelines, a one-half mile radius around the center of a RCW cluster necessary allowance for foraging habitat. The BA concluded that there are no RCWs or cavity trees in the proposed action area and that the nearest known active RCW cluster is approximately 1.89 miles away.

### **3.2.2 Red Wolf**

The red wolf is an endangered species that has been re-introduced on the adjacent Alligator River National Wildlife Refuge and has been observed on the DCBR. The BA found no wolves in the proposed action area. It is possible that the wolves may visit the site. The infrequency of their presence in the area indicates there would be no adverse impacts from the AWC restoration on the wolf population. Additionally, according to Mr. Mike Morse, Alligator River National Wildlife Refuge red wolf biologist, wolves are not considered to be sensitive to normal silvicultural or related human activities.

### **3.2.3 Bald Eagle**

The bald eagle is known to nest and winter in the area, specifically at Alligator River National Wildlife Refuge. However, no nests have been found on DCBR. Eagles have been sighted at DCBR and therefore the Air Force considers impacts to the species in the management of DCBR. They are discussed in the BASH (Bird Airstrike) Plan.

## **CHAPTER FOUR ENVIRONMENTAL CONSEQUENCES**

### **4.1 Introduction**

This chapter looks at direct, indirect, and cumulative impacts of the alternatives on the issues that were studied in detail. It addresses the environmental effects that cannot be avoided, as well as the relationship between the short-term uses of the environment, maintenance, and enhancement of the long-term productivity. In each case the irreversible and irretrievable consequences will be identified. This is organized by alternative.

### **4.2 Impacts of Alternative A: No Action**

Atlantic white cedar is not a strong competitor and intensive management is needed to reestablish this species in areas where it has been replaced. AWC does not tolerate shading, especially during the third year (Hinesley, 2002), which allows more shade tolerant hardwoods to dominate a site after the AWC component has been removed. In order to restore AWC, hardwoods must be removed. If this alternative is selected, the restoration of AWC would not occur and the species would not be reestablished in areas it was historically found.

#### **4.2.1 Impacts to Threatened and Endangered Species**

##### **4.2.1.1 Red Cockaded Woodpecker**

There would be no impact to the RCW if the Alternative A was selected.

##### **4.2.1.2 Red Wolf**

There would be no impact to the red wolf if the Alternative A was selected.

##### **4.2.1.3 Bald Eagle**

There would be no impact to the bald eagle if the Alternative A was selected.

### **4.3 Impacts of Alternative B: Restore AWC**

Alternative B would restore AWC on 62 acres by removing the mixed hardwood and loblolly pine stands and replant the area with AWC seedlings. The new AWC stand would take approximately 40 to 60 years to reach the maturity. The loss of AWC forests across its range is well documented and is evident on DCBR through a historical vegetation mapping project (Alion Sciences, 2006). The USAF is committed to the restoration of this ecotype and is using all available science and technology to that end.

This action would foster the regeneration of mature, mixed hardwood and loblolly pine forest stands into a younger, more virile AWC dominated forest. Returning the forest to a native ecosystem would also enhance wildlife biodiversity through improved habitat.

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### **4.3.1 Impacts to Threatened and Endangered Species**

#### **4.3.1.1 Red Cockaded Woodpecker**

The Biological Assessment conducted by Robert Montgomery, DCBR Wildlife Biologist, concluded that there would be no effect on the RCW if Alternative B were chosen. The BA states that no active RCW cavity trees or clusters were found within one-half mile of the proposed action area. The closest active cluster is located approximately 1.89 miles from the proposed timber harvest site. The proposed action area, which is currently mixed hardwood and pine forest stands, is not considered good quality foraging habitat based on the definition of as outlined in the USFWS Red-cockaded Woodpecker Recovery Plan (second revision).

#### **4.3.1.2 Red Wolf**

The Biological Assessment states that no red wolf dens were found within the proposed harvest area. The clearing of hardwoods and replanting with AWC will not adversely impact the red wolf as the area will continue to provide habitat for wolves to hunt for prey and utilize as travel corridors. In the short term, the increased human activity would cause the wolves to avoid the area until the replanting process is completed. USFWS will be contacted should a red wolf be encountered during the proposed action.

#### **4.3.1.3 Bald Eagle**

The nearest known bald eagle nest site is approximately 6.25 miles from the proposed action area and the project would not adversely impact this species. Though bald eagles are found on the Dare County peninsula, sightings are very rare on DCBR. Additionally, eagles utilize edge habitat, and the area could attract eagles due to prime hunting opportunities. However, the proposed action would be stopped immediately should a bald eagle nest be found in the action area and USFWS would be notified.

### **4.4 Impacts of Alternative C: Restore AWC on Less Acreage**

A successive patch restoration would meet the objective of the proposed action, but is more costly than Alternative B. The goal to restore AWC in certain areas where it was historically located would require multiple entries to clear timber and replant AWC if conducted on less acreage at a time. This alternative would increase replanting costs and reduce cost recovery of the cleared timber. The cost per acre restoration would increase due to the loss of economy of scale. Reduced cost recovery would leave fewer dollars for reinvestment into habitat improvement projects.

### **4.4.1 Impacts to Threatened and Endangered Species**

#### **4.4.1.1 Red Cockaded Woodpecker**

The Biological Assessment conducted by Robert Montgomery, DCBR Wildlife Biologist, states that no active RCW cavity trees or clusters were found within one-half mile of the proposed action area and the closest active cluster is located 1.89 miles from the area. The proposed action area is not considered good quality foraging habitat based on the definition as outlined in the USFWS Red-cockaded Woodpecker Recovery Plan (second revision). The proposed action would not have an adverse effect on the RCW.



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#### **4.4.1.2 Red Wolf**

Alternative C would have similar effects on the red wolf as Alternative B, wolves would avoid the area with human activity, but by restoring AWC on less acreage at a time, more entries into the forest are needed to achieve the objective.

#### **4.4.1.3 Bald Eagle**

Alternative C would have similar impacts to the bald eagle as Alternative B due to their minor presence on DCBR.

## **CHAPTER FIVE CUMULATIVE IMPACTS AND COMMITMENT OF RESOURCES**

Federal and US Air Force regulations implementing NEPA (42 USC § 4321 et seq. and 32 CFR 989, respectively) require that the cumulative impacts of a proposed action be assessed. CEQ regulations implementing the procedural provision of NEPA define cumulative impacts as: “the impact on the environment which results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions” (40 CFR 1507).

In order to analyze cumulative effects, a cumulative effects region must be identified within which effects of the proposed action and other past, proposed, and reasonably foreseeable actions would be cumulatively recorded or experienced. For this EA, the region where cumulative effects may occur includes all of DCBR.

### **5.1 Cumulative Projects**

DCBR’s mission is to provide target arrays for aerial ordnance delivery. Because of this mission, facility development is kept to a minimum and the majority of DCBR land is undeveloped in order to provide buffer zones. Therefore, the majority of projects on DCBR is of a natural resources activity and would be in conjunction with the proposed action.

#### **5.1.1. Forestry Management Projects**

Forest health is actively managed for at DCBR. Forest management is included in the Integrated Natural Resources Management Plan and has been developed for the long term sustainability of the forest at DCBR. Forest projects include the harvesting of timber in areas that have been designated as supporting commercial activities, the re-planting of AWC in areas that once supported AWC, and the thinning of vegetation to support red-cockaded woodpecker habitat.

#### **5.1.2. Red-Cockaded Woodpecker**

Annual activities related to the RCW include nest monitoring, banding, bird counts, both aerial and ground based, and cavity maintenance. RCW management activities do not occur across all of DCBR and are confined to RCW habitat ecosystems.

#### **5.1.3. Prescribed Fire**

Fire was an integral part of the ecosystem of Dare County prior to European settlement. The USAF, in conjunction with USFWS at ARNWR, is attempting to return fire to the peninsula through joint jurisdictional prescribed burns.

### **5.2 Cumulative Impact Analysis**

This section addresses, for each resource area, the additive effects of the proposed action in conjunction with the projects identified above. Since Alternative D (No Action) represents no change from existing conditions, no cumulative impacts would occur.

#### **5.2.1 Air Quality**

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The only future project expected to have impact to air quality is prescribed burning. Burns are conducted under specific constraints and prescriptions designed to reduce impacts to air quality. Prescribed burnings are short term events and air quality is not impacted long term due to burning activities.

### **5.2.2 Water Resources**

Water resources would not be impacted cumulatively due to the proposed projects. All of the proposed projects have occurred previously on DCBR and do not impede water flow.

### **5.2.3 Wetlands**

The proposed action and future projects would not cumulatively impact wetlands. All activities have been conducted in wetlands previously and have no significant effect on wetlands. Prescribed burning would result in a positive effect to the ecosystem.

### **5.2.4 Threatened and Endangered Species**

Cumulatively, the proposed action and future projects would have a positive impact to threatened and endangered species as the projects are designed to improve native habitat.

## **5.3 Irreversible and Irretrievable Commitment of Resources**

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. These resources are irretrievable in that once they are used for a project, they are no longer available for other purposes. This includes the use of non-renewable resources such as metal and fuel. Human labor is also considered an irretrievable resource. In addition, the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment is also considered an irreversible commitment of resources.

The proposed action does not commit any resources for a long-term or permanent basis. The harvesting of timber would utilize machinery on a short term and the cleared area will be replanted with a renewable resource. Short-term, human labor would be utilized to harvest timber, replant with AWC, and monitor the results of the study. Implementation of the proposed action would not result in significant, irreversible, or irretrievable commitments of resources.

## **CHAPTER SIX LIST OF PREPARERS**

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## **CHAPTER SEVEN LIST OF AGENCIES**

Internally, this Environmental Assessment will be distributed to

- ◆ Fourth Fighter Wing Environmental Protection Committee
- ◆ Headquarters Air Combat Command

Additionally, a copy this Environmental Assessment will be sent to:

- ◆ North Carolina State Clearinghouse
- ◆ North Carolina State Historic Preservation Office
- ◆ Alligator River National Wildlife Refuge
- ◆ Department of Marine Fisheries
- ◆ North Carolina Chapter of The Nature Conservancy

**APPENDIX A**

**DARE COUNTY BOMBING RANGE  
ATLANTIC WHITE CEDAR STUDY**

# Dare County Bombing Range Atlantic White Cedar Study

Study Plan  
Updated 18 October 2006

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**Objective:** Study the allometric trends in Atlantic White Cedar (*Chamaecyparis thyoides*) in the coastal plain of North Carolina at Dare County Bombing Range (DCBR). Atlantic white cedar is recognized as both an important wetland restoration species and a merchantable timber species. This research aims to address the effectiveness of establishing Atlantic white cedar (AWC) on pocosin soils and to model individual tree and stand level growth characteristics. Many fundamental questions about Atlantic white cedar are unanswered - optimal planting density, effectiveness of fertilizer and herbicides, and functional forms for growth and yield equations. As more emphasis is being placed on restoring Atlantic white cedar, forest land managers will need this information to make appropriate management decisions.

**Design:** Three replications of the study design will be established at DCBR. Each replicate will include three variables: distance between planting beds, distance between trees planted in the beds (density), and nutrition treatment (fertilized vs non-fertilized). There will be 12 plots in each replicate, with 6 plots fertilized and 6 plots not fertilized. Planting beds will be approximately 1 foot high and 5 feet wide and will be placed 10 feet apart and 20 feet apart, measured from center to center of the bed. Seedlings will be planted 5 feet, 10 feet or 15 feet apart in each bedrow. In Plot A, seedlings will be planted at 5 foot intervals down the bedrows, which are 10 feet apart, making a 5 X 10 plot. Plot B seedlings will be planted at 10 foot intervals (10 X 10), and Plot C seedlings will be planted at 15 foot intervals (15 X 10). Plots D, E, and F will have the same distance between trees down each bedrow, but the bedrows will be located 20 feet apart, to make 5 X 20, 10 X 20, and 15 X 20 density treatments (Tables 1 and 2). The study design will be set up as a Split-Plot design with the fertilizer treatment being the whole-plots and the spacing between trees per acre (density) being the subplots. Each density plot will be delineated within each whole-plot. A 50 foot minimum buffer between the subplot (density) and the whole plot (treatments) will be installed to reduce any adjacency effects from surrounding trees. Each plot will consist of 96-100 measurement trees planted at densities ranging from 145 to 871 trees per acre (Figures 1 and 2).

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Effective site preparation techniques will be used for the study area. Aquatic approved herbicides will be applied by aerial application over all treatment plots. Herbicide control will also be applied as a release treatment in the first and second growing seasons (planting strip only). A triple super phosphate fertilizer will be applied at a rate of 250 lb/ac every 2 years in the fertilizer treatment plots. Additional seedlings will be planted separately from the test plots to be used to replace dead seedlings in order to maintain the desired initial planting density.

**Size:** With a total of 12 treatments (6 spacings x 2 nutrition levels), the total area for each replication will be approximately 15.133 acres with 5,264 seedlings needed (not including area lost due to study design dimensions and other operational planting around the replication). The remainder of the stand will be planted on either a 10 x 10 ft spacing or a 20 x 5 ft spacing depending on the existing beds in the stand.

The total number of seedlings required for the study will be 15,792 ( $5,264 \times 3$ ) plus approximately 10,000 seedlings for operational plantings around the study.

**Location:** The study location and individual replications and treatment plots will be monumented. Additionally, GPS coordinates will be taken at the corners of all treatment plots. A copy of this material will be housed with the DCBR Installation Forester. All study plots will be vividly marked with flagging and/or paint. Signs will be placed indicating that it is an active research area.

**Spacings:** A modified spacing study design will be used to allow for bedding in one direction while allowing the spacing to vary within the bed. The spacings and initial planting densities for each replication ( $\times 2$  because of nutrition treatment) are given in Tables 1 and 2. The size of a full replication (all spacings and 2 nutrition regimes) is 15.133 ac. The total number of seedlings required, including buffer rows, for one full replication is 5,264. The 5 x 10 ft spacing has the highest initial planting density and is included to reflect the densities that are typical of naturally regenerated Atlantic white cedar.

**Seedlings:** Seedlings will be obtained from the N.C. Division of Forest Resources Tree Seedling Nursery Program. The seedlings will be from N.C. provenance genetic stock (containerized seedlings) and should be constant over all study sites. Approximately 26,000 seedlings will be needed for the DCBR study site. Seedlings that are of lower quality will be culled and not planted.



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**Timetable:**

Date	Objective
Summer 2007	Site prep – herbicide
Fall 2007	Site prep – bedding
Late Winter 2007 - Early Spring 2008	Layout study design Plant seedlings Fertilizer treatment
Spring 2008	Replace mortality
Spring/Summer 2008	Herbicide treatment
Spring/Summer 2009	Herbicide treatment
Spring/Summer 20010	Fertilizer treatment
Spring/Summer 2011	--
Spring/Summer 2012	Fertilizer treatment
Spring/Summer 2013	--
Spring/Summer 2014	Fertilizer treatment
Etc.	Etc.

**Measurements:** Initial seedling survival will be recorded along with total stem height. As the stems mature, further measurements on tree characteristics will be observed. Initial soil conditions will be analyzed at the center of each replication.

The following list of tree characteristics may be collected at the sites, note that some measurements will not occur until trees achieve a suitable size:

- Biomass (roots, shoots, above/below ground biomass, branches, stem)
- Carbon sequestration - Above and belowground total carbon
- Diameter at breast height (DBH)
- Height to live crown
- Leaf area index (LAI)
- Other allometric characteristics
- Site characteristics
- Soil characteristics
- Stem form
- Survival
- Total height
- Wood quality measures

**Demonstration:** A small size demonstration site (not replicated) will be planted outside of the study replications and not have any herbicide applied to it after site preparation. This will show the advantage of using herbicides to control the competing vegetation. Another small size demonstration site will be established without bedding (i.e. flat planted) to show the advantage of bedding.

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**Study Duration and Maintenance:** To limit any confounding factors, all other silvicultural treatments must be excluded from the study area for the duration of the research study. The study will be vividly marked and all personnel should contact research personnel prior to performing *any* activity on the research site (contact information on the following page).

Initial plot maps will be drawn up with the randomized treatment locations. Annual and biennial measurements will be made by researchers at NCSU with the aid of the DCBR Installation Forester. It is estimated that this research study site will be carried out for approximately 60 years. Many more research projects will be able to utilize the study site to answer questions about Atlantic White Cedar.

**Future Studies:** Research into the growth and yield of Atlantic white cedar will be ongoing throughout the 60 year duration of the study. This will include taper equations, volume modeling, green weight modeling, and wood quality studies at both the individual tree and stand level. There will also be opportunities for wildlife studies comparing the plantations with natural stands of Atlantic white cedar on DCBR. Other research projects may also be incorporated to the study design at later dates.

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**Table 1:** Spacing, initial planting density, and area in acres for each treatment combination.

Row (ft)	Column (ft)	TP A	Measurement Plot		Treatment Plot	
			# of trees	Area, ac	# of trees	Area, ac
5	10	871	98	0.1125	684	0.7851
10	10	436	100	0.2296	484	1.1111
15	10	290	96	0.3306	384	1.3223
5	20	436	100	0.2296	462	1.0606
10	20	218	98	0.4499	338	1.5519
15	20	145	96	0.6612	280	1.7355

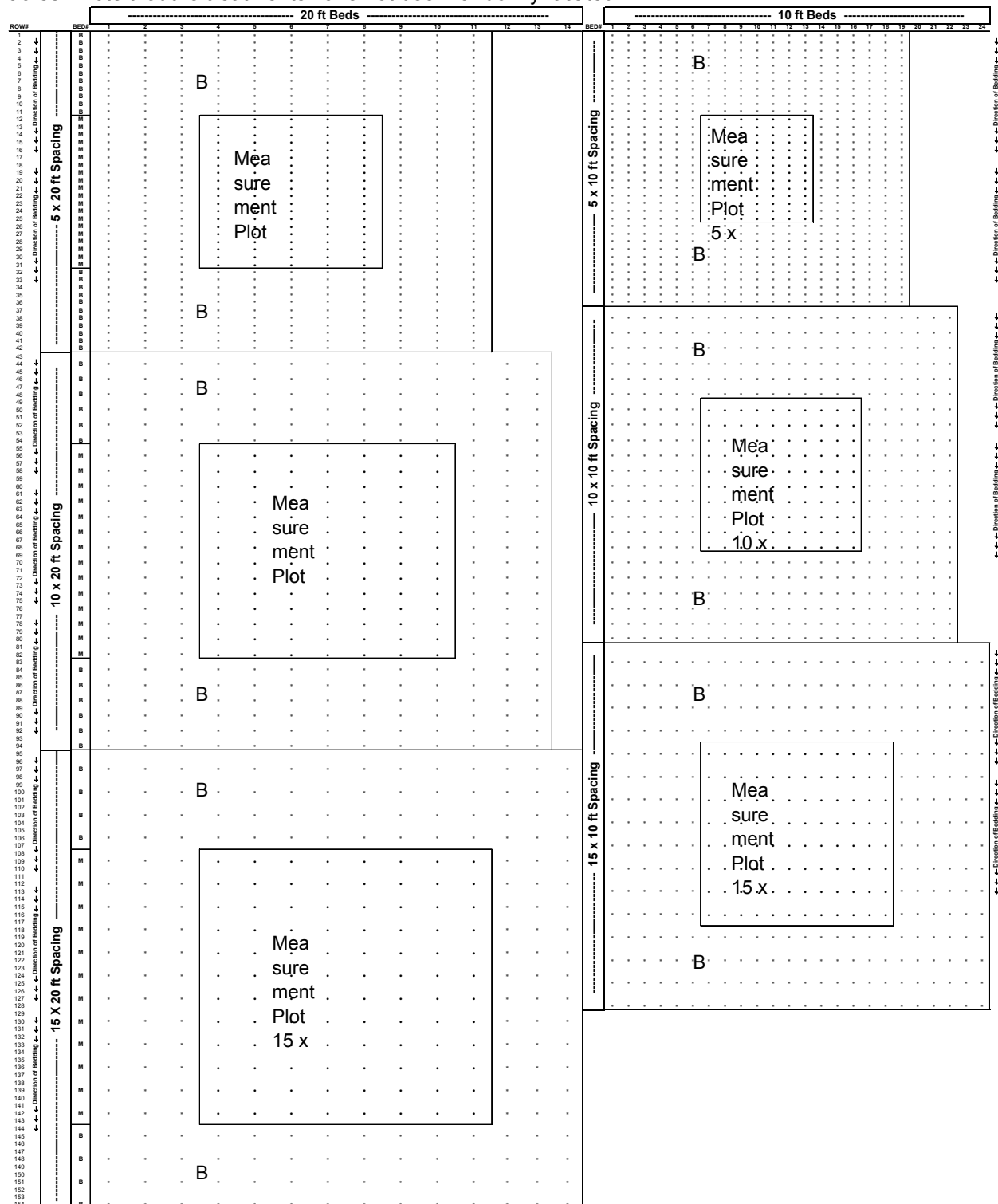
Where TPA = Trees per acre

**Table 2:** Measurement plot size for each spacing treatment (distance down rows by distance across beds, ft) and rectangularity of each measurement plot.

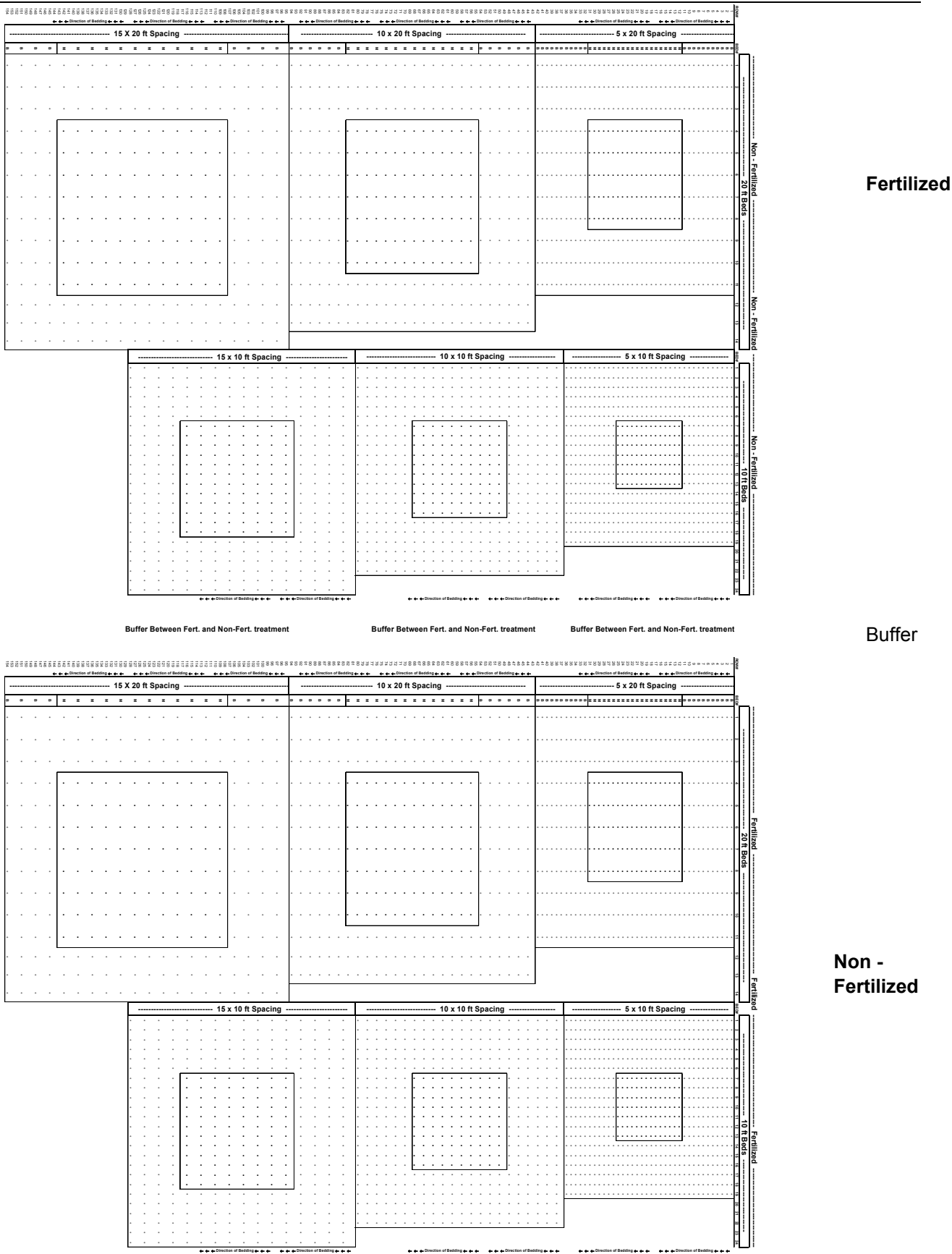
Row (ft)	Column (ft)	TP A	Measuremen t Plot Size (r × c)	Measuremen t Plot Size (ft)	Rectangularity (ratio)
5	10	871	14 rows × 7 col	70 × 70	1:1
10	10	436	10 rows × 10 col	100 × 100	1:1
15	10	290	8 rows × 12 col	120 × 120	1:1
5	20	436	20 rows × 5 col	100 × 100	1:1
10	20	218	14 rows × 7 col	140 × 140	1:1
15	20	145	12 rows × 8 col	180 × 160	1:1.125

Where TPA = Trees per acre

**Figure 1:** Diagram illustrating one half of a replication (fertilized or non-fertilized) with an area of 7.5665 acres. Note that the treatments have not been randomly located.



**Fig 2.** Diagram illustrating one full replication (fertilized and non-fertilized) with an area of 15.133 acres. Note that the treatments have not been randomly located.



**FINDING OF NO SIGNIFICANT IMPACT (FONSI)**

**Name of Action** Atlantic White Cedar Restoration  
Dare County Bomb Range (DCBR), North Carolina  
Environmental Assessment (EA)

As Wing Commander, and with the recommendation of the Seymour Johnson AFB Environmental, Safety, and Occupational Health Council, I have decided to implement Alternative B: Restore Atlantic white cedar at DCBR by removing 62 acres of existing vegetation and replanting with AWC.

**Rationale for the Selection of the Proposed Alternative**

I have selected Alternative B: Restore AWC (as identified in the attached EA) over the other two alternatives because it best satisfies Seymour Johnson AFB's objective to conduct an active, integrated forest management program at Dare County Bombing Range, continues restoration of AWC, and provides the most cost recovery for the action. Alternative B also complies with the Air Force policy of sustained yield from forested lands controlled by the Air Force.

I did not choose Alternative A: No Action because it does not meet this objective. I did not choose Alternative C: Restore AWC on Less Acreage because it would reduce the amount of forest returned to AWC stands and would not meet DCBR's Forestry program standards.

**Finding of No Significant Impact**

The attached EA was prepared and evaluated pursuant to the National Environmental Policy Act (Public Law 91-190, 42 U.S.C. 4321 et seq.). I conclude that implementing Alternative B does not constitute a "major Federal action significantly affecting the quality of the human environment," considering direct, indirect, and cumulative impacts. Therefore, we will not prepare an environmental impact statement. We will make this EA and FONSI available to the public for a 30-day comment period before conducting AWC restoration in accordance with AFI 32-7061 3.4.5.1.

The point of contact regarding this FONSI and the associated EA is Mr. Donald Abrams, 4th Civil Engineer Squadron, Seymour Johnson Air Force Base, North Carolina 27531-2355. The telephone number is (919) 722-5168.

14 Sep 07  
DATE



STEVEN L. KWAST Colonel, USAF  
Commander, 4th Fighter Wing